



COLONY AND PROTECTORATE OF SIERRA LEONE

ANNUAL REPORT

OF THE

Department of Agriculture

FOR THE YEAR

1944

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1945

The Annual Report of the Department of Agriculture, for 1944.

SIR,

I have the honour to submit my report for the year 1944.

SECTION I (a)—INTRODUCTION AND POLICY.

2. Erratic weather conditions at the beginning of the rains somewhat disturbed rice planting in 1944 and the main crop harvest was rather late. The crop was however satisfactory and total production is estimated to have been at least average or greater than that of the previous season. There was an appreciable increase in the production of subsidiary food crops, especially root crops—cassava, sweet potatoes and yams.

3. Exports of palm kernels, ginger, piassava and cocoa were all in excess of 1943 figures.

4. During the year the department continued its wartime policy of directing a maximum food production campaign. Rice production, as usual, was the predominant work. The cultivation of rice in inland and littoral swamps was appreciably extended, and, in addition, the growing of crops other than rice in the swamps during the dry season has increased steadily under the stimulus of departmental propaganda, and assistance with planting material. The impact of Freetown food and labour demands upon Protectorate farming remained acute. Farmers, however, again rose to the occasion and adequate food supplies were available throughout the year.

5. The increased cultivation of inland swamps and the opening up of new areas in the mangrove swamps is serving the dual purpose of increasing food production and helping to relieve the pressure on the over-farmed upland areas. As yet, the bulk of the country's rice is still produced on the uplands but, with more and more farmers becoming accustomed to swamp farming, present indications are that the move to the swamps is permanent and likely to proceed at an accelerated pace in the future.

6. In many parts of the Protectorate, and especially in the "forest" and "bush" chiefdoms adjacent to the rail and road system, the already serious degradation of the uplands has been accelerated by over-intensive farming to meet the abnormal demands for rice and other annual food crops. As soon as the present emergency period is over measures must be taken to limit upland farming to an extent that will allow a safe fallow period between crops. Simultaneously steps must be taken to stop the cultivation of annual crops on hillsides and steep slopes subject to accelerated erosion. The problem of how best to ensure soil conservation is already receiving the serious consideration of all the departments concerned. An immediate and complete practical solution cannot be expected but trials are now under way to provide information which should lead to the evolution of sound farming systems based on either bush or grass fallows or on more intensive cultivation combining the use of manures and composts.

7. The development of stock-farming in the Northern Divisions, under the aegis of the Agricultural and Veterinary Departments, although necessarily long-term in effect, should provide a basis for new farming methods which will maintain soil fertility in the uplands in that area.

8. In the Colony and also near the bigger towns in the Protectorate there has been an increase in intensive market-gardening in connection with which the utilisation of town and village refuse as manure is an encouraging feature.

THE HONOURABLE

THE COLONIAL SECRETARY

FREETOWN.

9. In all the work of the department in 1944, whether in increased rice seed distribution, swamp clearance and cultivation, Native Administration seed farms, irrigation work or stock-rearing, indications are that a period of consolidation is now essential if the considerable expansion caused by the impetus of war demands is to be maintained in post-war years. The rate of progress is governed largely by the staff available and the ability of the farmer to adopt new methods. Recent developments have tended to outpace the available supervision and labour. For example rice seed distribution has reached a limit, by force of circumstances, beyond which it is inadvisable to proceed further. The purity of much of the seed is now in question and, if the selection work at Rokupr and multiplication work at other stations is to have its full effect upon rice production, it will be necessary to limit seed distribution to pure strains only. Departmental and Native Administration agricultural staff is being trained as fast as possible but meanwhile all work, if it is to be done thoroughly, must be kept within practical bounds.

10. The policy of the department has remained unchanged but, as in earlier war years, the emphasis has been on production. I give below the policy approved by Government and the work initiated or extended by the Department during the year under each head of the policy:—

A.—THE ADEQUATE PROVISION OF FOOD FOR THE PEOPLE.

This is to be accomplished by:—

I. The improvement and spread of swamp rice cultivation to such an extent that not only will the needs of the people be supplied in a bad year but there will be a surplus for export in ordinary years.

Work initiated or extended in 1944.

- (i) *Swamp Reclamation.*—Constructional work by the Irrigation and Drainage Branch has continued in the Yakban, Luti and Rosino areas of the Scarcies. With adjustments to constructional work to suit local conditions, the bulk of the reclaimed areas should be ready for cultivation in 1945. Test plots at Luti show that high yields can be expected in completed areas.
- (ii) In the Ribbi-Bonthe mangrove clearing schemes 921 farmers have now cleared approximately 4,360 acres, of which 3,000 acres have been planted. The scheme is popular and working well. Many more applicants require assistance but, with labour scarce, no further commitments are being undertaken until the present farms have been consolidated.
- (iii) Preliminary soil surveys are being carried out in certain Ribbi and Maswari swamp areas where abnormal soil problems require elucidation before actual reclamation schemes can be started or extended.
- (iv) Large scale clearing and planting of inland swamps by community or paid labour was continued with the active co-operation of the Native Administrations. Where paid labour was used there was in some cases a financial loss but the project served the valuable purpose of increasing production and getting upland farmers accustomed to wetland cultivation. The next step is to get individual farmers to take up work in the cleared swamps.
- (v) Seed distribution from Departmental and Native Administration Schemes totalled the record figure of 23,477 bushels. The schemes have served to provide ample seed throughout the country but, with seed now becoming mixed, concentration will be made in future upon a reduced distribution of pure selected seed only.
- (vi) *Water Boards.*—Two Water Boards, Mambolo and Loko Masama, were formed during the year. They are working well and proving useful in the administration of drainage projects.

II. The better cultivation of inland swamps and valleys for rice during the wet season and the introduction of crops other than rice in swamps during the dry season.

The most noticeable result of Makeni and Kenema inland swamp work has been the general increased dry season cultivation of swamps amongst farmers. Sweet potatoes, cassava and, to a lesser extent, vegetables are being grown on a steadily increasing scale as dry season crops after swamp rice. The same development is occurring in the Sembahun and Scarries areas. 3,131 bushels of seed rice were distributed by Native Administrations for inland swamp planting.

III. The extension of Garden and small-field crops to serve as an auxiliary food supply.

Whilst no new work has been started there have been increased demands for planting material of improved varieties of yams, sweet potatoes and cassava, and for fruits, especially citrus. Market gardening has progressed particularly in the Gloucester, Leicester and Hastings districts, where the production of both European and native vegetables, together with fruit, is well established. The Military vegetable garden at Hastings is a first-rate example of what can be done to produce European vegetables by intensive manuring and irrigation.

IV. The selection (or introduction) and distribution of seeds and plants suitable for I, II and III.

Selections and trials of improved varieties of swamp rice have continued at Rokupr Rice Experimental Station, whilst at other Stations, notably Njala, Makeni and Newton, trials are in progress with new imported varieties of sweet potatoes, cassava, yams, beans and tobacco. Distribution of successful varieties is developing well in all areas and demand exceeds supply.

V. Improvement of Poultry and stock.

The full time services of a Veterinary Officer during the year and the further improvement at the Teko Stock Farm have established a working basis for investigations into cattle health, breeding and feeding. Controlled grazing trials with various grasses and legumes at Njala and Teko promise to give valuable results. Silage tests also promise well. Work with pigs has been continued but, owing to disease, high feeding costs and slow maturity of the present stock results have been disappointing. The distribution of pure and cross bred R.I.R. poultry was continued on an increased scale.

B. THE CULTIVATION OF MONEY CROPS OR THE EXPLOITATION OF WILD TREES FOR EXPORT PURPOSES.

No new work.

C. THE ARRESTING OF THE DEGRADATION OF THE FOREST GROWTH OF SIERRA LEONE OR AT ANY RATE INCREASING THE REGENERATION PERIOD BETWEEN SUCCESSIVE BRUSHINGS OF THE SAME AREA

Preliminary discussions were held between officers of the Forest and Agricultural Departments and the Provincial Administration to decide how best to check the degradation of the hillsides in the Kenema Division. The Forestry Ordinance is being amended to allow danger areas to be declared "Soil Conservation Areas." Agricultural and Forest Officers will carry out surveys on which rehabilitation measures will be based.

D. THE IMPROVEMENT IN THE PREPARATION AND MARKETING OF PRODUCE.

No new work.

E. THE PRESERVATION OF THE STANDARD OF EXPORT PRODUCE BY INSPECTION

No new work. The Produce Inspection branch despite lack of staff carried out its normal duties efficiently, particular attention being paid to piassava at Bonthe.

F. CO-OPERATION WITH EDUCATION DEPARTMENT WHERE POSSIBLE IN THE TEACHING OF AGRICULTURE.

Njala Training College has trained 32 Agricultural Instructors since its inception in 1939. Most of these, with experience are proving very reliable. Whilst a far larger number could be absorbed into the Department, lack of staff at the College and lack of adequately educated recruits preclude the training of increased numbers without lowering the standard.

G. RESEARCH

Except for continued investigation into new types of rice at Rokupr and grasses at Njala it has not been possible to carry out any serious research work. Whilst war production work remains the first priority officers who normally concentrate upon research will continue to perform other duties. The Plant Pathologist, however, despite this handicap, has written a valuable report on the cacao industry.

H. CONSERVATION OF SOIL

Experience is being gained in the management of grasslands at all stations, where cattle are kept, and in the use of farmyard manure and composts, but it still remains to extend this knowledge to peasant farmers. The most that can be done at present is to encourage upland farmers to change to the swamps and to adopt all the normal anti-erosion methods. This is being actively pursued within the scope of available staff.

I. NUTRITION

Schemes for the increased distribution of poultry and planting material, fruits and garden crops have continued to be very successful and are having a noticeable effect upon the variety of food. In addition the steady expansion of dry-season swamp farming is ensuring a more adequate and varied diet for the people over the whole year.

J. EXTENSION WORK. ALL EXTENSION WORK AND PROPAGANDA MUST BE BASED ON INFORMATION GAINED FROM EXPERIMENT OR FROM EXPERIENCE BY AGRICULTURAL OFFICERS IN SIERRA LEONE.

Six Native Administration seed farms were started in the Kenema District.

SECTION II—THE WORK OF THE AGRICULTURAL DEPARTMENT. (a) ORGANISATION AND STAFF

11. The Department has suffered even more than in previous years from lack of Staff, in spite of the fact that the approved establishment was increased by the addition of the new post of Principal Agricultural Officer. Dr. F. J. Martin, who had served in Sierra Leone from 1924 and who had been Director since 1934, proceeded on leave in early June prior to retirement, and I did not reach Sierra Leone till the middle of December. Mr. J. W. D. Fisher, Principal Agricultural Officer acted as Director from June until early November, but was unfortunately on the sick list for the greater part of the time from early in September and had finally to proceed on leave on medical grounds in December. Mr. E. T. Holmes, Senior Agricultural Officer, was transferred to Nigeria on his return from leave early in the year, in exchange for Mr. G. W. Lines M.B.E., who, however, could not arrive in Sierra Leone till December. It was therefore necessary to call on the Plant Pathologist to act as Principal Agricultural Officer from June and to act as Director for the period of the Legislative Council sitting in November and till my arrival. The absence, for most of the year, of a Senior Agricultural Officer to assist in administrative duties at the Department's headquarters at Njala greatly increased the pressure of work on the Headquarters staff. Though the headquarters of the Department are at Njala, it is necessary for the Director to visit Freetown frequently.

12. As from the end of September, the Rice Mill at Cline Town and all matters in connection with rice collection, distribution and accounting were handed over to the Supplies Department, and the Agricultural Officer posted to the Agricultural Department's Freetown Office was released for more normal duties. Another of the Department's more senior Agricultural Officers was invalided during the year through ill-health. The Entomologist, who had been acting as an Agricultural Officer for the last four years, was seconded to the Gold Coast for work at the West African Cocoa Research Institute at Tafo. No new officers have yet been appointed to fill these vacancies, nor has it yet been possible to fill the post of Marketing Officer. The Inspector of Plants and Produce has been seconded to the Supplies Department, his work being however very efficiently carried out by the Senior African Sub-Inspector of Plants and Produce. The Livestock Officer, since his return from leave in July has acted as Agricultural Officer, Newton. Thus while the establishment of the Headquarters and field staff of the Department remained at seventeen European Officers, only nine were in Sierra Leone at one period of the year, and during most of the year only ten were in the country. This number was augmented by calling on the services of the Plant Pathologist and the Livestock Officer, but was inadequate for staffing seven Agricultural Stations (at least two of which should be two-men stations), the Njala Training College and the Headquarters administration of the Department.

13. Of the four Specialist posts three remain vacant since Mr. Thompson, who has been recommended for one of the two posts of Agricultural Chemist, has had to remain an Agricultural Officer during 1944, and the holder of the fourth post has acted as Principal Agricultural Officer or Director during the year.

14. The establishment of the African field staff of the department was increased by three to 75. The salary scales and grades of the technical staff, which had been revised to correspond with those of other technical departments, took effect as from 1st January, 1944. A new class of agricultural students was recruited for training at the Njala Training College.

(b) AGRICULTURAL STATIONS

NJALA

15. Crop experimental work was largely directed towards upland pasture establishment and management, with a view to (a) the possible recuperation of degraded upland soil by rotational cattle grazing (b), the improvement of grassland for cattle feeding (c) the selection of improved grass varieties, and (d) determining the productivity of pastures under rotational grazing.

16. Trials were started using Guinea Grass (*Panicum maximum*), Elephant Grass (*Pennisetum purpureum*), and *Andropogon tectorum*. Preliminary results indicate that Guinea Grass stands intensive grazing best. A grazing trial was started with the legumes *Pueraria phaseoloides* which is the best leguminous fodder-cover crop yet tried in Sierra Leone. Rhodes Grass (*Chloris gayana*) and *Paspalum dilatatum* were introduced from East Africa. Rhodes Grass established itself well on upland lateritic soil.

17. Pit silage, using Elephant grass, maize and *Andropogon*, both alone and mixed with *Pueraria* and *Calapogonium*, was made experimentally. All, but especially the mixtures, produced good silage.

18. *Livestock*.—The breeding stock of cattle maintained its good condition. Working oxen were distributed to Rokupr, Newton and the Irrigation and Drainage Branch. On account of high feeding costs and slow maturity pigs again proved to be an uneconomical proposition. It is possible that an earlier maturing breed might prove more successful. Poultry work continued. 450 chicks were reared during the year and 234 fowls distributed for breeding purposes. 6,993 eggs were produced.

19. *Extension work*.—The Agricultural Officer, Njala, supervised work in Bo, Pujehun and part of Moyamba district mostly concentrating upon Native Administration swamp cultivation schemes and rice seed distribution. 2,128 acres of swamp rice in Bo-Pujehun Districts and 91 acres in Moyamba District were cultivated during the year under Native Administration schemes. In the whole area 1,450 bushels of seed rice were distributed under Departmental and Native Administration distribution schemes. The Bo rice mill produced 1,456 bushels of milled rice.

ROKUPR.

20. *Crops*.—Rice investigational work continued. Comparative yield trials were conducted with six selected varieties and with new importations from Ceylon, Peru and British Guiana. The cultivation experiment, now in its fifth year, has confirmed previous results that cultivation gives considerably increased yield over no cultivation and that early digging (February) is more beneficial than digging immediately before planting (July). 62 different varieties or selections of rice have been maintained for future plant breeding work.

21. The whole of the experimental block was brought under complete water control and several advantages are already apparent amongst which the use of wet instead of dry nurseries promises to give good results.

22. *Extension work*.—The distribution of seed of improved rices was continued in the Scarcies area. 9,483 bushels being distributed under Departmental and Native Administration Schemes. 400 bushels of seed rice were purchased for shipment to the Gambia.

23. A five-acre demonstration rice plot was established in the Luti reclamation area. It yielded well and is expected to do much towards convincing rice farmers who were naturally sceptical of the new drainage projects.

24. The small rice mill at Rokupr served the purpose of a central store for supplies to essential workers in the district. In addition 1,834 bushels of milled rice were produced by the mill.

25. *Irrigation and Drainage projects*.—These are detailed in the Irrigation and Drainage Branch's report.

SEMBEHUN

26. *Crops*.—No experimental work was undertaken during the year. The swamp rice seed production farm gave disappointing yields owing to deep flooding and fish damage. *Helminthosporium* and *Pericarpia* further adversely affected the yields.

27. As in 1943, a dressing of town refuse (five tons per acre) gave excellent results for upland crops. Yields of 9 tons of yams, 8 tons of arrowroot and 1,500 lb. Castle Cary groundnuts per acre being thus obtained. This, on poor sandy soil, is impressive and demonstrates the necessity for encouraging the fullest possible utilisation of all available town and household refuse for maintaining and improving the fertility of garden and farm lands.

28. *Extension work*.—This is the most important work of this station. Work on the Mangrove Loan Scheme had been largely confined to improving and consolidating existing farms. The scheme is working excellently on sound lines and, providing care is taken to keep expansion within the scope of available staff, it should have a pronounced effect in relieving the over-farmed uplands in the Ribbi-Bonthé areas. During 1944, 81 farmers received £291 in loans. Since the commencement of the scheme 921 farmers have received loans amounting to £3,991 and 4,360 acres have been cleared of which 3,000 acres are producing rice.

2,207 bushels of seed rice were distributed under Departmental and Native Administration seed schemes.

MAKENI

29. *Crops*.—The farm has continued as a departmental demonstration of the improved cultivation of valley bottoms and the surrounding slopes. It was hoped to study dry season irrigation by damming the stream but owing to the farm's proximity to the town and the possibility of increasing mosquito-breeding, this part of the programme had to be curtailed. Despite this, good dry season crops of sweet potatoes, maize, beans and other vegetables have been grown after rice in the wet-land plots.

30. On the uplands, plantation crops such as bananas, Smooth Cayenne pine-apples, citrus, coconuts and oil palms have all done well.

31. The demand for planting material, particularly of citrus, pineapples and coconuts, is increasing and the distribution during the year included the following :—

citrus plants 592, coconut seedlings 584, pineapple plants 836, oil palms 220, coffee plants 1,050, breadfruit seedlings 115, yams 7,179 lb.

32. The small plot of pepper (*Piper nigrum*) is progressing satisfactorily and preliminary reports on samples of berries sent to the Imperial Institute are very encouraging. Three imported tobaccos, Bourbon, Virginian Hybrid and Magnum Pryer, were grown successfully and experiments in curing were carried out. Although as a pipe tobacco these types do not appear strong enough for the local palate, they may prove suitable for local cigar manufacture. Six varieties of rice were grown in the swamp for seed multiplication purposes.

33. *Livestock*.—The cattle herd has thrived throughout the year, providing working oxen and farmyard manure. The farmyard manure is utilised with grass and farm refuse to make composts. Sheep and goats suffered from disease and work on these has been discontinued for the present.

34. *Extension work*.—In addition to maintaining the previously established sub-station at Batkanu and the three Bombali District Native Administration seed farms six new Native Administration seed farms were established in the Karene District. Several varieties of rice were tried at all these farms. Sughandi and Lead are proving most popular amongst local farmers. 5,718 bushels of rice seed were distributed under departmental and Native Administration seed schemes.

KENEMA.

35. *Crops*.—Work on the farm has largely consisted in seed rice production. The experiment in water control has caused too thorough drainage, and it is clear that before attempting to improve the natural water supply of inland swamps more data must be obtained by experiments with a variety of irrigational methods. European vegetable growing has had fair success but has been handicapped by lack of good seed.

36. *Livestock*.—With the exception of pigs, livestock was not successful during the year. Cattle became infected with Bovine Pleuro-pneumonia at the end of the year. With better housing and feeding the stock of pigs increased considerably. Dried blood, and calcium in the form of crushed oyster shells, caused a marked improvement in growth, but with the present inbred stock, largely Berkshire—native crossbreds, the growth rate is disappointingly slow.

37. *Extension work*.—The drive for increased production of rice was continued throughout the year but, with ample seed now in the hands of farmers, seed distribution was 200 bushels less than in 1943. Farmers were encouraged to keep their own seed and, with Native Administrations becoming increasingly responsible for their own distribution schemes, it is expected that future seed distribution will be more easily controlled and the purity of the seed improved. 4,289 bushels of seed rice were distributed during 1944 under departmental and Native Administration seed distribution schemes.

38. A preliminary survey of rice planting both in inland swamps and uplands of Kenema District was made during the year. Instructions were given in improved methods of swamp rice cultivation. Wet nurseries and transplanting are gradually extending and the practice of growing cassava and sweet potatoes after the rice crop is increasing steadily.

39. Ten Native Administration seed rice schemes, with corresponding seed farms, were in operation during the year. The tendency has been for these farms to increase in size at the expense of adequate cultivation and supervision. In an attempt to check this tendency more Native Administration agricultural staff is being trained and the formation of Native Administration Farming Committees, consisting of a few responsible farmers, is receiving consideration with a view to keeping Native Administration agricultural schemes within practicable proportions and ensuring that technical advice and instructions are adequately carried out.

NEWTON

40. *Crops*.—Work at this station has included investigation into methods of soil recuperation by using (a) farmyard manure, (b) composts, (c) leguminous cover crops and (d) regeneration of pastures. This work is of considerable importance to the future of the over-farmed thickly populated uplands of the Colony Peninsula.

41. Fruit trees of all types improved during the year as a result of dressing with farmyard manure and artificials.

Cinnamon trees have grown well and samples of prepared bark sold readily. Larger quantities of bark will shortly be prepared to test the commercial market.

42. Trial pasture plots of Guinea grass and *Pennisetum purpureum* were established. Pigeon peas and *pueraria* both grew well. Good pit silage was made from *Andropogon tectorum* and may offer a solution to the dry season feeding of stock.

43. The irrigated vegetable garden has been extended as a demonstration of swamp valley utilisation. European and native vegetables and fruit seedlings have been produced there whilst five imported South African varieties of sweet potatoes are doing well.

44. *Maswari—Reclamation of Saline Swamps*.—These test plots were designed to investigate the possibilities of growing rice on cleared littoral mangrove swamps. It was expected that empoldering would keep out the salt spring tides, whilst draining and rainfall would leach out any salt in the soil thus making it possible to grow rice. From experience on the plots in 1944 it is becoming clear that the problem is a complex one involving several interrelated factors such as salt concentration, cultivation, soil reactions, the presence of peat and careful water control. It is foremost a chemical problem. Preliminary soil samples have been taken and it is hoped in 1945 to carry out a thorough survey combining chemical, agricultural and water control investigations.

45. *Livestock*.—The small herd of cattle, whose health was satisfactory, has been invaluable in providing the farmyard manure necessary for upland soil-recuperation tests.

46. *Extension work*.—Market garden supervision in the Colony area and advice to Service gardens formed a large part of the extension work. Vegetable gardens at Gloucester, Leicester and the military gardens at Hastings bear visual evidence of this assistance. By-products of the Rice Mill have been liberally used at Hastings.

47. Distribution of planting material, such as yams, cassava, and sweet potatoes, continued, whilst 330 bushels of seed rice were distributed to local farmers for swamp cultivation.

TEKO STOCK FARM

48. From the beginning of the year the breeding and selection of cattle was based upon milk production. Detailed records of breeding, milk yields, feeding trials and calf-rearing are being kept. This accumulated data should, in time, provide useful information for future work.

49. The policy of selection for milk production, culling out all those animals yielding below the standard, is beginning to bear results. The standard set is 3 lb. of milk per cow per day throughout the whole lactation. The average lactation period was 152 days and the average milk produced per lactation was 390 lb. The maximum lactation period was 296 days with a maximum yield of 860 lb. These figures are likely to be improved upon shortly. A number of feeding trials were carried out with milking cows, calves and young growing stock. Milk substitutes were tried in calf feeding.

50. Investigations were made into plants suspected of being poisonous to stock. *Tilacora* was found to be poisonous but *Ipomea involucreta* and *Spigelia* were not.

51. The seventeen cows and three bulls introduced for trial from French Guinea are a mixed lot of no exceptional merit. Several of the cows aborted and only one calf survives.

52. Sixty acres of bush have been cleared and cropped, and, although late planted, yielded sufficient produce and silage as a supplementary feed during the dry season. Various grasses are being propagated to provide pasture planting material during 1945 when grassland trials will be commenced.

(c) RESEARCH

PLANT PATHOLOGY

53. The Plant Pathologist was attached to Head Office throughout the year, acting as Principal Agricultural Officer from 11th June and Director from 2nd November to 16th December. Little plant pathological work was possible but a few general collections were made, whilst the Plant Pathologist wrote an account of data collected during a general survey of Cacao carried out by him in 1939 to 1940.

54. Four further records of rust (*Uromyces appendiculatus*) on climbing French beans were made in European vegetable gardens in the Colony, and at Kailahun and Njala in the Protectorate. It would appear likely that this rust has recently been imported on seed from South Africa as well as, earlier, from the Gold Coast. Maize rust (*Puccinia sorghi*) was recorded for the first time in Sierra Leone at Bo, apparently causing little harm to the maize plants. A streak disease, presumably caused by a virus, was found upon Elephant grass (*Pennisetum purpureum*) and *Chasmopodium caudatum*. Guinea grass and *Andropogon tectorum* growing nearby were not affected.

ENTOMOLOGY

55. The Entomologist, Mr. F. A. Squire, acted as an Agricultural Officer up to 28th March when he left the country on secondment to the West African Cacao Research Institute. During the rest of the year the Laboratory Assistant, Mr. J. S. Wellington, carried on the routine duties of the section. Mrs. F. J. Jordan, temporarily employed as Entomologist, Citrus Moth Investigation, paid a visit to the Gold Coast, in connection with the problem there, from 3rd April to 10th May and returned to England on 30th June.

56. *Report on Citrus Moth Investigation.*—During the year night collections were made at Old and New Njala and the total number of moths caught was 24,129, representing some 60 species of fruit piercers. The majority of these moths (23,295 or 97 per cent) were caught during the period April to June. The peak period of moth prevalence was, as usual, reached in May when 17,719 moths (73 per cent) were caught. Species of *Achæa* predominated, the total for the thirteen species recorded being 18,626 or 77 per cent of the total number of moths caught.

58. The following fruits were attacked by moths—cashew, citrus, mango, jak, governor plum, monkey apple, *Sarcocephalus esculentus* and *Ficus ottoniæfolia*. The last three are wild fruit, and the last appears to be a new adult food plant record. Of the total of 24,129 moths caught during the year 15,303 (64 per cent) were caught on mango alone, while only 352 (1½ per cent) were caught on citrus. Moth attack on the main citrus crop at Njala (which reaches maturity in November and is over by the middle of March) was negligible; only 83 moths were caught on citrus during January to March, the balance of 269 moths recorded being caught during the second quarter on the small intermediate citrus crop. The total number of windfalls recorded for the main citrus crop was 14,435 of which only 48 were observed to have been pierced by moths.

59. New records for larval food plants are as follows :—

(Moth)	(Food Plant)
<i>Achæa catocaloides</i>	<i>Mangifera indica</i> <i>Uvaria afzelii</i> <i>Terminalia ivorensis</i> <i>Anisophyllea laurina</i> <i>Coffea stenophylla</i>
<i>Achæa lieftardii</i>	<i>Mangifera indica</i> <i>Cassia siberiana</i> <i>Dialium guineensis</i> <i>Terminalia ivorensis</i> <i>Anthostema senegalense</i> <i>Ficus capensis</i> <i>Phæseolus vulgaris</i> <i>Gouania longipetala</i> <i>Placodiscus pseudostipularis</i>
<i>Anomis auragoides</i> }	
<i>Anomis flava</i> }	<i>Hibiscus sabdariffa</i>
* <i>Anomis sabulifera</i> }	
<i>Dermaleipa metaphæa</i>	<i>Combretum comosum</i>
<i>Mocis undata</i>	<i>Combretum comosum</i> <i>Phæseolus vulgaris</i>
<i>Mocis punctularis</i>	<i>Phæseolus vulgaris</i>
<i>Parallelia angularis</i> }	
" <i>Macrorhyncha</i> }	<i>Phyllanthus discoides</i>
" <i>proxima</i> }	
<i>Parallelia palumbiodes</i>	<i>Citrus aurantii</i> <i>Citrus paradisi</i>

60. Out of the large number of 396 fruit moth larvæ bred in the laboratory only eighteen specimens of parasites emerged, viz., seven Dipteron, one Braconid, six Ichneumonid and four Helminth, all of which await identification.

61. At the suggestion of the Medical Entomologist, who visited Njala to study malaria control, a weekly count of mosquitoes in a selected bush house is being taken in order to give an indication of seasonal variation.

62. In the early part of the year a few swarms of Desert locusts (*Schistocerca gregaria*) appeared in the Eastern district bordering French Guinea but little damage was done.

CHEMISTRY

63. A free grant of £12,000 was approved under the Colonial Development and Welfare Act for research in agricultural Chemistry in Sierra Leone. Such work is urgently needed in connection with problems of swamp rice cultivation, with particular reference to the areas reclaimed by the Irrigation and Drainage Branch. Chemical investigations in connection with human nutrition and the food values of forage crops available for livestock also need early attention. Provision has been made for the appointment of two Agricultural Chemists and the necessary African Assistant staff. Unfortunately it has not yet been possible to obtain or release officers to fill these posts. An indent has however been prepared for the necessary laboratory equipment, and Mr. H. A. Thompson, at present acting as an Agricultural Officer, has been able to do some preliminary field survey work in connection with the scheme. A youth has been selected and granted a scholarship at the Prince of Wales School to continue his studies to Higher School Certificate, after which he will be considered for appointment as Laboratory Assistant to the Chemist.

(d) RICE MILLING

64. The large Cline Town Rice Mill, which continued to run to capacity, was handed over to the Supplies Department on 1st September.

(e) PRODUCE INSPECTION

65. Mr. C. G. White, Sub-Inspector of Plants and Produce, Grade I, acted as Inspector of Plants and Produce in the absence of Mr. F. W. Browning-Allinson seconded to Supplies Department. Inspection of palm kernels, piassava and ginger proceeded along normal lines whilst other duties included the weekly collection of produce trade statistics, the issuing of produce licences and the inspection of weights and measures.

66. 1944 palm kernel exports showed an increase over 1943. Sixty-six per cent of the total exports was inspected. The bulk of this produce passes through the Port of Freetown. A limited quantity of piassava, of which 90 per cent passed inspection, was exported. The export of this product continues to be limited by a quota. With the closing of Sulima as a port attempts have been made by certain buyers to ship the lower grade "Sulima" type from Bonthe as "Prime Sherbro". This necessitated strict enforcement of the piassava export rules and very close inspection of all consignments for export. Ginger exports in 1944 showed an increase compared with 1943. Seventy per cent of the export was inspected. Cocoa export reached a new record. A small quantity of beeswax was handled by the Inspection Branch.

67. The number of produce licences issued in Freetown in 1944 was 752, a slight increase over the 1943 figure.

(f) AGRICULTURAL EDUCATION

68. Training of Agricultural Instructors continued at Njala Training College. Agricultural teaching was in charge of Mr. H. A. Thompson, Agricultural Officer, for the first quarter of the year. Mr. T. P. Wheldon, Agricultural Officer, was in charge from March onwards, Mr. G. C. Taylor, Agricultural Assistant, Grade I, assisted with the Agricultural Course for ten months of the year.

69. Since its inception in 1939 the college has trained 32 Agricultural Instructors, eight being appointed to the Agricultural Department in 1944.

70. The fourth year group of agricultural students continued their course, instruction being given in agriculture, crop husbandry, animal husbandry, fungal diseases and insect pests, surveying and building, arithmetic and English. The final examinations were held in October, and of the ten students, eight have been appointed as instructors in the Agricultural Department. During the year, at the

request of the District Commissioner, Moyamba, five students carried out a Chain and Compass Survey, and prepared a plan of the Native Administration swamp at Manjehun. In January, the students were on trek for four days collecting data for individual Economic and Ecological Surveys of typical swamps in the Bo and Moyamba Districts. With Mr. Wheldon and Mr. Taylor these students visited the stock farm at Teko, taking part in the practical work of the farm, and lectures and demonstrations were given by the Veterinary Officer and the Agricultural Officer. In the latter half of the year, the fourth year students were posted to agricultural stations for two months to gain more practical experience. Three went to Kenema, three to Teko, two to Rokupr and two to Sembahun.

71. The new group of students, sixteen in all, arrived to begin their course in July. Instruction was given in botany, soils, climate and vegetation, surveying, arithmetic and English, with introductory discussions on general agricultural topics. They took over the college farm from the fourth year group, and three hours were spent each morning working on the farm.

72. The college farm and nurseries were still further extended, continuing the system of strip cultivation. The farm now comprises six annual and six permanent strips. The sixth permanent strip, added this year, comprises a coffee and cacao plantation, and a plantation of mixed fruit trees; while on the new sixth annual strip, broadcasting of mixed crops on the lines of native practice was done on one-half of the strip, while the other half was devoted to pure cropping of local crops. The six plantation strips now consist of the following crops—citrus oil palms, coconuts, bananas, mixed fruit trees, coffee and cocoa. The five annual strips are down to elephant grass, under an experimental seven-year rotation scheme. A variety of vegetables were grown in the nursery, and various seedlings of tree crops were also raised. The poultry improvement scheme, under which Rhode Island Red male birds run on open range with native hens was maintained.

IRRIGATION AND DRAINAGE BRANCH—ANNUAL REPORT, 1944

BY

MR. C. J. RAE, CHIEF IRRIGATOR AND DRAINAGE ENGINEER

73. The year 1944 has been one during which the Irrigation and Drainage Branch has been settling down to productive work, after the transition stage mentioned in last year's report. The progress made has been considerable, if not fully up to what were probably rather over optimistic hopes. As progress with construction work is now almost entirely dictated by the availability of supervisory staff, I think it advisable to reverse the procedure adopted in the 1943 report and deal with the establishment factor first.

74. *Establishment.*—The position as regards European Technical Staff has not been at all satisfactory during the year due to the incidence of leave, and the delays, inevitable in war time, in filling sanctioned vacancies. The sanctioned scale at the end of 1944 and the position on 31st December, 1944 was :—

1 Chief Irrigation and Drainage Engineer	...	...	on duty
1 Senior Assistant Irrigation and Drainage Engineer			vacant
3 Assistant Irrigation and Drainage Engineers	...		on duty
2 Senior Foremen of Works	...	...	1 on duty
			1 on leave
4 Foremen of Works	...	...	2 on duty
			2 awaited
1 Mechanical Foreman	...	...	1 on duty

At one stage in July there were only three engineers available, (Senior Assistant Irrigation and Drainage Engineer acting as Chief Irrigation and Drainage Engineer, one Foreman of Works and no Mechanical Foreman)

75. The Chief Irrigation and Drainage Engineer visited Nigeria from 3rd February to 15th April. He proceeded on leave on 10th June and returned on 22nd November.

76. The health position during the year amongst both European and African Staff has continued to be very satisfactory with only relatively few absences due to sickness.

77. *Equipment.* The equipment position is now satisfactory. Considering the extremely arduous conditions under which the heavy machinery now in use (e.g. excavators, bulldozer and stonebreaker) are working, breakdowns have been surprisingly few and none of these has been serious enough to immobilise any item for more than a few days.

78. Both launches have worked well but towards the end of the year there has been a series of breakdowns in both and it is obvious that a complete overhaul of both boats is necessary. Unfortunately work in the Scarcies area is so dependent upon water transport that this cannot be done until the rains reduce outdoor work, as relief launches are not available. Three small marine engines are on order and on arrival will be fitted into local hulls. This will greatly relieve the present pressures on the two existing launches. As regards road transport, becoming more important daily, the position is reasonably satisfactory but more motor cycles for Works Foremen are essential.

79. A steady trickle of small tools, spare parts, etc. is coming in, in response to indents sent to United Kingdom in 1943 and 1944.

80. All three excavators are now working in the Scarcies area and giving excellent results. The original operators (all Africans) are steadily gaining in proficiency and several apprentice drivers are under training and show promise.

81. *Construction Work.* The principal construction work during the dry season 1943 to 1944 was the construction of the flood embankments and sluices for the Yakban project of approximately 4,800 acres. The work was completed, except for the fitting of sluice gates, before the rains stopped outdoor work. The sluices for this project are of a new design with a much larger capacity and much better control than those at Rosino and Luti. During the current dry season (1944 to 1945) the gates are being fitted to these sluices, and the internal drainage and plot layout of approximately half of the Yakban area is being done, and thus about 2,000-2,400 acres of this project should be available for cultivation in 1945.

82. A new item which is of very considerable importance, and which will become even more important as time goes on, is the question of road communications to and in the reclaimed areas. A very effective start was made on this during the year with the construction of a road system from Rokupr and Mange to Mambolo and Mando (Little Scarcies). The survey and settling out of the alignment was done by the Irrigation and Drainage Branch, whilst the work of clearing the line and construction apart from bridges and culverts was done by the tribal authorities. The cost was met in part by this Branch and in part from Native Administration Funds. As the tribal authorities have been pressing for a motor road to Mambolo for a long time they gave the most enthusiastic co-operation in the work, which was largely completed, but for bridging, by the end of the year. For the time being only temporary timber bridging is proposed, to be developed into permanent bridging later as traffic justifies that course. The main section of this road system, from the main Public Works Department road near Mange to Mambolo, will be taken over by the Public Works Department as a government road after three years if traffic justifies it. The other roads will remain as "Chiefs' Roads" for the time being.

83. At the end of the rains (October) the three excavators were moved over to start work on the Robis project between Mambolo and the Little Scarcies River.

84. In addition to the major works mentioned above, a considerable amount of minor work was done. The first engineer's residential bungalow together with the office and store at Rokupr were completed during the year. A bush house for the foreman-in-charge of the Yakban project was also built.

85. During the year an Assistant Irrigation and Drainage Engineer (M. Spencer-Knott) was posted to open a new branch station at Bo to supervise work in inland swamps, etc. A store and office for this branch has been under construction and is nearly finished. A start was made on the river clearance work on the Beye River in the early months of 1944, but progress was not satisfactory owing to lack of supervision and labour difficulties. The work was re-started in November, 1944, and work was also started on the Mayanki River, near Makeni.

86. At Freetown, work continued at Murray Town Workshop and Store site. The store was completed, temporary shedding for workshop use was improved and made more permanent, and additional plant installed. A small jetty for the loading of launches, etc., was completed.

87. In the Colony Peninsular, work was done on the Wellington Anti-Malarial Drainage Project. The peculiar conditions extant on this site has resulted in much of this work being on a trial and error basis to overcome various difficulties quite outside all textbook theory. At Maswari an additional area of some 70 acres was empoldered by a small embankment. Here again unforeseen difficulties arose, and the embankment gave trouble due to subterranean infiltration through an underlying layer of peaty humus. The embankment has had to be provided with a puddle core and this will be completed shortly and should solve the problem.

88. *Surveys and Investigation.*—During the dry season 1943 to 1944 detailed survey of the Robis area was completed and survey of the Rhombe area started. For reasons given later in this report the survey of the Rhombe area has been suspended in the 1944 to 1945 dry season, and work started on the survey of a large area of mangrove and raphia swamp between the Ribbi and Bumpé Rivers. A detailed survey of the Aberdeen Creek area, adjacent to Freetown, was also started in October, 1944. This is in connection with suggested anti-malarial work in this area.

89. There was a marked increase in the collection and correlation of hydraulic data during the year. Gauges have been established on many rivers and a steady flow of readings is now coming in. These, when interpreted in conjunction with local rainfall statistics, will result in a much closer appreciation of possible maximum flood conditions being obtainable, with consequent increase in the safety of works and probable economy in future design work. Discharge measurements in the Mabole, Rokelle, Sewa, Teye, Moa and Waanji rivers are being taken regularly throughout the year.

90. Further survey work was suspended in connection with the Rhombe drainage project mentioned in paragraph 108 of the 1943 report. Observations have shown that the Little Scarcies river is very unstable in its lower reaches and that the time is not favourable for the construction of flood embankments on the south side of the river.

91. *Development of completed Projects.* The final development of those projects where the major construction work has been completed has not progressed as rapidly as was hoped, but solid progress has been achieved, and a great deal of local prejudices overcome. The two areas concerned are the Rosino and Luti projects. In the case of the former, serious trouble arose due to excessive silting in the outfall channel from the sluice to the river. This silted up to a level two feet above the invert of the sluice, and, as a result, the area flooded very heavily, and this could only be relieved by cutting the embankment. The outfall channel is being altered and

cleared in the dry season 1944 to 1945 and as an added safeguard the sluice is being enlarged. These measures should completely remove trouble. In the Luti project the Agricultural Department and one local farmer cultivated test plots of rice and obtained exceptionally good results. One of the Agricultural Department's plots gave over 60 bushels of Paddy per acre and the local farmer obtained over 40 bushels. As a result of this the local chief and farmers who had hitherto been very conservative and sceptical of these "newfangled ideas" are now very interested in the project. In both projects the internal drainage is being improved in the light of the practical experience now gained and the whole of both areas is being laid out in regular 3-acre plots.

92. As already stated under the heading "Construction works", a part of the Yakban area should also be laid out and taken up in time for the 1945 cultivation season.

93. *Water Boards.*—A new feature is the coming into effective operation of the Water Ordinance with the appointment of two Water Boards in the Scarcies; one, the Mambolo Water Board, for the area north of the Little Scarcies, and the other the Loko Masama Water Board for the swamp area immediately south of the Little Scarcies River. These Water Boards have a mixed membership of official and tribal representatives, and both boards worked extremely well. Several meetings have been held and great interest was shown in these meetings by the tribal representatives. It is now apparent that they provide an excellent medium for the dissemination of information and propaganda on the development work either in progress or projected. The procedure laid down in the Ordinance regarding the discussion and sanctioning of development projects is now being strictly followed and is working satisfactorily.

I have the honour to be,

SIR,

Your obedient Servant,

R. R. GLANVILLE,

Director of Agriculture.

DEPARTMENT OF AGRICULTURE,
FREETOWN,

10th May, 1945.

